a target 2.5 at % Cr composition and 14 at % Pt composition and selected such that the residual magnetic flux density exceeds 1 T (Tesla). For the magnetic properties, magnetization curve was measured under the application of external magnetic fields up to 10 KOe by VSM (Vibrating Sample Magnetometer) measured values and characteristic values were determined based on the magnetization curve.

[0078] For the magnetic properties of the CoCrPt/Cr film, the coercivity exceeded 2000 Oe, and the coercivity squareness exceeded 0.8 to show high residual magnetic flux density value in each case of forming on the glass substrate or on the Al_2O_3 film. On the other hand, the magnetic properties of the CoCrPt/Cr film formed on each of the layers of the stack of magnetoresistive layers-thin film showed remarkable lowering of coercivity value, coercivity squareness and residual magnetic flux density to deteriorate the permanent magnet characteristics compared with the case of deposition on glass or Al_2O_3 (refer to Type A of No. 1 to No. 6 in Table 1).

[0079] To confirm the effect of the amorphous film **9** of the present invention, the amorphous thin film **9** was formed on the substrate identical that those described above (Type A in Table 1) and on the thin film after ion beam etching, and then a CoCrPt/Cr thin film (magnetic domain control film **11**/magnetic domain control film underlayer **10**) was formed and magnetic properties were measured. The result is shown as Type B in Table 1. An NiTa thin film was selected as the amorphous thin film **9** and, after depositing the NiTa thin film and then exposure to atmospheric air to oxidize the surface, a CoCrPt/Cr thin film was deposited. The Ta composition in the NiTa thin film was 30 at % and it was previously examined that addition of Ta by 30 at % or more rendered the NiTa film to an amorphous thin film and to a non-magnetic thin film. Further, Ta was selected as the addition element because a broad peak intensity was observed by X-ray diffractiometry for the thin film with addition of Ta to Ni and the amorphous metal thin film **9** could be formed.

[0080] Further, in view of another investigation, it has been found that amorphous metals are formed by optimizing the addition amount and forming conditions when P, Cr, Zr, Nb, Hf, In, Mo, Ti, V, W, Ru, Rh, Pd, Pt, etc. are added to Ni or Co. Further, in view of another investigation, it has been found that a CoCrPt/Cr thin film formed on the amorphous film comprising, for example, NiP, NiZr, NiNb, NiHf, NiW, NiPd, CoZr, CoCrTa, CoCrNb, CrTi, etc. shows good magnetic properties.

TABLE 1

Magnetic Properties of CoCrPt/Cr Film on NiTa Amorphous Film

No.	Type	Constitution of sample layer	Coercivity Hc (Oe)	Residual magnetization Br (KG)	Coercivity squareness S
1	A	CoCrPt/Cr/Al_2O_3	2250	10.3	0.88
	B	CoCrPt/Cr/NiTa/Al_2O_3	1850	10.5	0.83
2	A	CoCrPt/Cr/Glass	2200	10.5	0.89
	B	CoCrPt/Cr/NiTa/Glass	1600	9.7	0.82
3	A	CoCrPt/Cr/Ta/Glass	800	6.5	0.65
	B	CoCrPt/Cr/NiTa/Ta/Glass	1450	9.2	0.78
4	A	CoCrPt/Cr/NiFa/Ta/Glass	350	1.1	0.3
	B	CoCrPt/Cr/NiTa/NiFa/Ta/Glass	1550	9.8	0.82
5	A	CoCrPt/Cr/MnPt/NiFeCr/Ta/Glass	820	4.2	0.35
	B	CoCrPt/Cr/NiTa/MnPt/NiFeCr/Ta/Glass	1390	9.3	0.8
6	A	CoCrPt/Cr/CoFe/MnPt/NiFa/Ta/Glass	550	3.5	0.4
	B	CoCrPt/Cr/NiTa/CoFe/MnPt/NiFa/Ta/Glass	1430	9.3	0.77

[0081] The magnetic properties of the CoCrPt/Cr thin film formed on the NiTa amorphous metal thin film showed slight lowering when formed directly on an Al_2O_3 thin film or glass substrate, compared with a case without the NiTa amorphous film but they still showed a high coercivity value of 1500 (Oe) or more (comparison between A and B for Nos. 1, 2 in Table 1). Further, the magnetic properties of the film when the NiTa thin film was formed on each of the layers of the stack of magnetic recording layers-thin film, that is, the Ta film, NiFe film, MnPt film, and CoFe film and then exposed to atmospheric air were better compared with a case without the NiTa amorphous film, showing high values as about 1400 (Oe) of coercivity and about 0.8 of coercivity squareness (refer to type B of No. 3 to No. 6 in Table 1).

[0082] To examine the cause of the change of the magnetic properties, crystallographic orientation of respective CoCrPt/Cr films was examined by X-ray diffraction θ-2θ method. It has been found that the Cr film formed on the grass and Al_2O_3 film showed Cr (110) orientation and the CoCrPt film (magnetic domain control film **11**) thereon showed mixed crystal orientation of Co(00.2)Co(10.0)Co(11.0). On the other hand, an intense Co(00.1) peak was observed for the CoCrPt/Cr thin film formed on each of the layers of the stack of magnetoresistive layers-thin film to reveal a structure in which the C axis of the Co hexagonal closed packed crystal structure is intensely oriented in the direction vertical to the film plane. They correspond to the states of State A1 and State A2, respectively, in **FIG. 6**.